

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND
TECHNOLOGY**

**COLLEGE OF ARCHITECTURE AND PLANNING
DEPARTMENT OF BUILDING TECHNOLOGY**

**INNOVATIVE FINANCING OF ROAD PROJECTS IN THE
GHANAIAN CONSTRUCTION INDUSTRY.**

A Dissertation Submitted to the Department of Building Technology in
Partial Fulfillment of the Requirements for the Award of Master of Science
[MSc] in Construction Management.

BY

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NOVEMBER, 2014

DECLARATION

I hereby certify that all material contained within this report is my own work towards the award of MSc Construction Management and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University.

All sentences or passages quoted in this dissertation from other people's work have been specifically acknowledged by clear cross-referencing to the author.

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ABSTRACT

Road transport represents a dominant force in the transport industry in developing countries. It therefore stimulates growth and development. However, traditionally roads provision in developing countries has been the responsibility of government and the huge budget constraints over the years has made governments unable to effectively fund road infrastructural provision. This problem calls for paradigm shift in the provision of road infrastructure in Ghana. Consequently, the study was articulated with the aim of exploring innovative ways of financing urban road projects in Ghana. A quantitative enquiry to the study was adopted and subsequently, close-ended questionnaire was utilised in eliciting response from the major stakeholders in the road construction industry. The data was subjected to analysis using descriptive and inferential statistics. Based on the overall rankings the findings revealed that *Construction management* and *Public private partnership* are the modern or innovative project financing options frequently used in urban road projects. *Accessible financing*, *Cost effectiveness*, *Improved quality of services* among others are the drivers that somewhat push innovative road financing. The barriers identified to be significant were *Contractual complexity*, *Unfavourable economic and commercial conditions*, *Corruption issues* all having mean values greater than 3.50. Throughout the study it became apparent that most innovative financing projects in other infrastructure projects were awarded not on competitive basis. It is therefore recommended that innovative financing of urban roads be awarded on competitive basis to ensure value for money. Public engagement is necessary, especially with the affected communities. The study explores a relatively new area and consequently serves as the basis to spur future research.

Keywords: Innovative Financing, Road Projects, Construction Industry, Urban Roads, & Road Infrastructure.

DEDICATION

I dedicate this work to my loving wife, BARBARA JONAH-NARH, my daughters, ANNABEL LAMKIE NARH, ANNORA LAMKUOR NARH and ANNALYNN LAMLE NARH for their selfless, relentless and unflinching contribution towards my academic life in particular and my life in general.



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KNUST



CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

The construction industry refers to the industry that deals with the creation, renovation, extension or repairs of building and other engineering construction such as roads, bridges, dams etc. (Anaman and Osei-Amponsah, 2007). A vibrant construction industry is an important means to promote employment and consequently to improve economic growth (Anaman and Osei-Amponsah, 2007; Xue et al., 2008; Al-Najjar et al., 2009; Hammad et al., 2011). Kumaraswamy (2006) cited from Enshassi et al. (2009) further argued that the industry is the major driver of physical development for the national economy.

In developing countries, road transport represents a dominant force in the transport industry and carries in excess of 90 percent of domestic freight and passenger traffic (Addo-Abedi, 1997). Hence, road transport is a major asset that stimulates growth and development. Consequently, governments in Africa today are increasingly convinced of the value of road infrastructure investment and therefore efforts are geared towards improving the sector (Brushett, 2005). These efforts by government have been studied and concluded that it has promoted renewed interest in the sector by official financing partners and donor countries (Brushett, 2005).

However, improving infrastructure delivery (including roads) has always been problematic and the continuing accumulated infrastructure debt in Ghana calls for a more innovative medium of infrastructure financing (Badu et al., 2012). Traditionally, infrastructure and construction projects in developing countries are financed by the state with its insufficient resources.

This problem is further aggravated by the global economic crisis leading to a shrink in the financial capacity (Abadie, 2008) especially of developing countries.

In an attempt to address and arrest this canker, several international financial system established quasi-public agencies with the mandate to serve as banks for infrastructure investment in developing countries (Ngowi et al., 2006). However, given the huge infrastructure commitments required in developing countries the mandate of these agencies was changed from financing to that of promoting private investment in infrastructure financing through securitization of loans (Ngowi et al., 2006). According to Ndupuechi (2003) and, Ngowi et al. (2006) the active involvement of private sector in infrastructure projects is expected to usher in a more efficient and competitive markets whiles reducing the borrowing rates of the developing countries and stimulating economic growth. Ndupuechi (2003) argued that the role of the private sector in financing projects is neither new nor unique as it has been around centuries ago.

Generally, project finance involves the use of non-recourse or limited recourse financial structure where debt used to finance the project are paid back from the cash flows generated by the project (Annamalai and Jain, 2013). The proper formulation and management of private financing can alleviate the financial burden of huge infrastructure cost on government (Kwak et al., 2009).

Undoubtedly, infrastructure developments are instrumental in the delivery of quality of life to affected community. The road sector would be unable to play its catalytic role in the delivery of quality of life and sustainable development unless the problem of financing is addressed (Addo-Abedi, 1997). There is therefore the need to find sustainable means of financing road projects. The role of private financing and consequently innovative financing in the improvement of infrastructure delivery (including roads) has gained worldwide recognition. Surprisingly, despite the growth of project finance globally a limited empirical research has been conducted in the

area (Annamalai and Jain, 2013). It is therefore imperative to identify the role of innovative financing of roads in the Ghanaian construction industry.

1.2 PROBLEM STATEMENT

According to Ghana Poverty Reduction Strategy (2003) cited from Badu et al. (2012), Ghana faces substantial debt and insufficient resources to meet demand for infrastructure needs (including roads). The current strain on the public purse further exacerbate this problem with governments increasingly looking for private investors to finance pressing projects (Ndupuechi, 2003, Ngowi et al., 2006;). Accordingly, Addo-Abedi (1997) observed that road construction and its maintenance are grossly underfunded leading to the deplorable state of roads in developing countries. However, the plethora of challenges, both local and global in the field of private financing militates against the successful implementation of innovative financing in infrastructure financing (Ngowi et al., 2006).

Traditionally, governments' subsidies and foreign borrowing has always been the escape route for the vicious circle of infrastructure financing dilemma (Ngowi et al., 2006). Ndupuechi (2003) noted that privately financed projects are inherently risky owing to the varied nature of contractual and financial arrangements. Available literature has discussed the challenges and problems confronting private financing in the construction industry (Ploeg and Casey, 2006; Platz and Schroeder, 2007; Badu et al., 2012;). However, Ngowi et al. (2006) noted that various private financing tools would fail to meet development targets so far as there are inherent barriers to implementation. Consequently, Badu et al. (2012) also explored the potential impediments to innovative financing tools.

Despite this dearth of knowledge on private financing, the experience of the public sector with Public Private Partnerships has not always been positive (Kwak et al., 2009). They identified that most Public Private Partnerships are usually terminated or held up. The fear of significant losses potentially to be suffered by investors in the event of project failure in project financing further deepens this experience (Annamalai and Jain, 2013). It is against this background of lack of funds of road projects leading to masking of other road problems denying the contribution of roads to the growth of the economy, that the study explored innovative financing of road projects in the Ghanaian construction industry.

1.3 RESEARCH AIM AND OBJECTIVES

1.3.1 Aim

The aim of this research was to explore the sustainable innovative ways of road project financing in the Ghanaian construction industry.

1.3.2 Research objectives

The following measurable objectives have been set as a guide.

- To identify the current state of road financing in Ghana.
- To identify the inherent barriers to sustainable innovative financing of road projects in the Ghanaian construction industry; and
- To identify the drivers to sustainable innovative financing of road projects in Ghana.

1.4 SIGNIFICANCE OF THE STUDY

The continuing trend of infrastructure development financing coupled with the growing realization of the limitation of public funding for infrastructure development in both developed and developing countries suggest active participation of the private sector and consequently project financing in the provision of infrastructure (Ndupuechi, 2003; Ngowi et al., 2006; Badu et al., 2012;). Notwithstanding, private finance of projects is saddled with a lot challenges (Kwak et al., 2009; Badu et al., 2012; Annamalai and Jain, 2013;) including its implementation in the Ghanaian Construction industry.

The purpose of this dissertation is to identify innovative ways of road project financing in the Ghanaian construction industry and aid the formulation of financial packages for project financing that are sustainable. The author anticipates that the study will be most beneficial to the project companies in the private sector who have limited expertise and knowledge of the instruments involved in innovative financing, depending mostly on specialists in the field. With the growing practice and increasing complexity of partnership arrangements, the public sector could also benefit from this research as it provides insight into the field of public private partnerships. Hence, the study should prove to be a valuable resource to public sector officials involved in the evaluation of project finance tenders.

1.5 SCOPE OF THE STUDY

The study was limited to contracting firms who are qualified and registered with the Ministry of Roads and Highways, and the Ministry of Water Resources, Works and Housing. Over seventy percent (70%) of Ghanaian Contractors tend to operate officially in the Greater Accra and Ashanti Regions of Ghana (Ahadzie, 2007). Consequently, the study geographically was limited

to these two regions. Accra and Kumasi Metropolises was chosen from these regions because of the readily available data as compared to other parts of the regions. The construction firms to be considered for the study were D1K1 and D2K2 ministry of works classification of contractors (the minimum annual turnover of these companies over the past three years should not be less than GH¢ 475,000.00 US\$ 500,000.00) and A1 and A2 Road contractors registered with the Ministry of Roads and Highways, as they have the requisite capacity to undertake the works usually financed through project financing.

The respondents in these regions were major construction stakeholders usually involve in private project financing – Contractors, Consultants, Public Sector and the Private sector. With the public sector, clearly the study focused on those whose activities are related to private project financing. Top management within these stakeholders was used as they are involved in decision making. The sampling technique used was clustered (see for instance Fugar, n.d.). Purposive sampling was subsequently used to draw sample from the population for the determination of sustainable innovative approaches to road project financing.

1.6 METHODOLOGY

The methodology utilised a two-stage approach; desk study and field research. Consequently, the research adopted a quantitative approach of enquiry. A critical review of germane literature was conducted to discover the theoretical paradigms underpinning the subject and help to identify the existing tools or instruments used in financing projects and their development and application in the Ghanaian construction industry. The review sourced credible and scientific data from the extant literature through journals, unpublished thesis, publications of corporate bodies and books.

The second stage, field research, involving data collection targeted data and information collection. By using series of questionnaires data and information gathered from the various respondents in Accra and Kumasi Metropolises. The information on the questionnaires included also likert scale rating of challenges and drivers of road project financing in the Ghanaian construction industry to allow easy categorization and synthesis. The data was further analysed using relative importance index, independent t-test, and mean score rankings (index).

1.7 DISSERTATION ORGANISATION

The structure of the thesis was divided into five (5) interdependent chapters, and follows the following outline. Chapter 1, "General Introduction" presents the background to the research and the problem necessitating research efforts. The research aims, research questions, objectives, and scope are all contained in this chapter. Chapter 2; is titled the literature review. The review provided an extended coverage on earlier works.

These aspects of literature were reviewed and attempt made to tie them together. It discussed fully the sustainable innovative ways of project financing in the Ghanaian construction industry. Chapter 3; focused on the research methodology and explore the philosophical approach to the research and situated it within its appropriate jurisdiction. Detailed discussions are provided on the data collection analytical tools employed. Chapter 4 presented the empirical analysis of data and discussions from the field survey that answered all the research objectives and questions. Chapter 5 is titled "Conclusions and Recommendations" and presented the summary of the entire research endeavour by reviewing the main contributions of the research to knowledge. Policy recommendations and limitations of the research were also outlined. Pointers as to where future research attempts should be directed were also clearly defined.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

Globally, construction project infrastructure has been identified as a major driver for the improvement of the standard of living (Global Insight, 2013). The infrastructure gap that exists in developing countries further makes the need to provide infrastructure a pressing one. However, construction projects in developing countries are mostly unable to complete because of financing problems. For example, Oyedele (2013) observed that construction project finance is a major bane in developing countries and must be addressed if any meaningful development is to take place. Several methods of traditional financing of construction projects exist (i.e. Open Tendering, Selective Tendering, etc.). Surprisingly, they appear not to yield the expected results.

The Traditional sources of finance of construction projects in developing countries usually are wholly from taxation, subvention, etc. by the public. Unfortunately, the increasing accumulated infrastructure debt in Ghana (Badu et al., 2012) and other developing countries suggests a more alternative and innovative methods of financing construction projects. Improving infrastructure financing is exigent, thus requiring a holistic approach to the issue.

This chapter seeks to give an insight on the various aspects of the project topic to give an in-depth understanding of the research area. The chapter starts with an overview of the construction industry, financing of projects in the GCI and the options available; financial engineering in the GCI, etc. The review attempts to cover at length the inherent challenges to financial engineering implementation in the GCI, derivatives of financial engineering whilst mitigating the challenges.

2.2 OVERVIEW OF THE CONSTRUCTION INDUSTRY

Generally, construction of physical facilities makes up about half of the Gross Domestic Product and these tend to be concentrated on basic infrastructure in mining, transportation, etc. The contribution of the construction industry to Gross Domestic Product (GDP) and thus the development of economies has been explored by many researchers (Enshassi et al., 2007; Anaman and Osei-Amponsah, 2007; Xue et al., 2008; Enshassi et al., 2009; Hammad et al., 2011; Choy et al., 2011). Consequently, the industry has been identified as a locomotive for development (Kumaraswamy, 2006 cited from Enshassi et al., 2009) given the percentage of labour it employs directly and indirectly (Anaman and Osei-Amponsah, 2007). The industry does so by mobilizing and effectively utilizing local human and material resources in the development and maintenance of infrastructure to promote indigenous employment (Anaman and Osei-Amponsah, 2007). Also, the other sectors depend on the construction industry for performance (Oyedele, 2013).

The construction industry is the sector of the economy that ,engages in the preparation of land, creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature and other such engineering constructions such as bridges, roads and dams (Oyedele, 2013; Anaman and Osei-Amponsah, 2007). Accordingly, construction projects usually involve the design and build of new structures (Zwikael, 2009). Despite the considerable potential and the vital role the sector plays in achieving economic balance and social development, few national development plans unequivocally consider the construction sector in relation to other sectors (Moavenzadeh and Rossow, 1976). This is very predominant in developing countries where most of the development plans are explicitly on the development of public sector.

The construction industry in Ghana has experienced a steadily growth since 1970 (Ghana National Commission for UNESCO, n.d.). The Industry is one of the major economic sectors in Ghana and the third largest contributor to Gross Domestic Product (GDP) overtaking the Manufacturing Industry (Anaman and Osei-Amponsah, 2007). The sector also experienced a 10% growth in 2008 and a negative growth rate of 1% as a result of the global economic recession according to the Ghana National Commission for UNESCO report (n.d.). Several attempts have been made by governments to improve the sector owing its importance to economic development. Palpable among the attempts are the creation of ministries and subsidiaries to oversee the activities of the industries (see for instance Ghana National Commission for UNESCO, n.d.). For example the Ministry of Roads and Highways (MRH) with the support of its subsidiaries (i.e. Ghana Highway Authority, Department of Feeder Roads and Department of Urban Roads) is mandated to provide and maintain a safe, reliable and efficient road infrastructure to promote economic growth.

In terms of housing, the Ministry of Water Resources, Works and Housing is the government body in charge of it. The agency is responsible for the registration of contractors (building or civil contractors) in collaboration with the Registrar General's Department. The contractors are classified based on certain criteria stipulated by the ministry upon registration (see Amoah et al., 2012). The MWrWH has two main classifications for contractors: Category 'D' for general building works and category 'K' for civil works. The department of rural housing under the ministry is responsible for the promotion of policies of rural estate development and the coordination of rural housing delivery programmes.

2.3 FINANCING OF INFRASTRUCTURE PROJECTS IN THE GHANAIAN CONSTRUCTION INDUSTRY

The unprecedented economic and environmental challenges have brought the importance of infrastructure into a sharper focus and accordingly recognised by both politicians and populations alike (Global Insight, 2013). This is also seen in the necessity to establishing reliable infrastructure throughout history by powerful empires (Ngowi et al., 2006). Increased economic growth invariably brings about an immense demand for basic infrastructure such as roads, ports and power generation facilities (see Ke et al., 2009). According to World Bank estimates, a ten percent (10%) increase in infrastructure assets is causally related to an increase in GDP by one percent (1%) (Beckers et al., 2013). Correspondingly insufficient or underdeveloped infrastructure hamper economic growth and development (Beckers et al., 2013). For instance in Brazil development is constrained by narrow roads and a lack of railways in the new agricultural frontiers (Beckers et al., 2013). The Brazilian situation is typical across many developing countries including Ghana (see Oyedele, 2013; Ke et al., 2009). In Africa, substandard infrastructure constricts growth by 2% annually (Global Insight, 2013).

Traditionally, financing of infrastructure and construction projects is the responsibility of governments in developing countries like Ghana (Abadie, 2008). As a result infrastructure projects are high on governments' agendas (Beckers et al., 2013). However, the situation is confronted by financing issues. The long-term issue of funding and the shorter-term options of financing of infrastructure are issues policy makers and government officials need to address (Global Insight, 2013). Africa's infrastructure funding gap is anywhere from \$30 billion to \$90 billion (Global Insight, 2013).

Notwithstanding, successive governments have always tried to make infrastructure provision their priority. Several options are available to delivery of infrastructure projects. This leads to our subsequent section – options of construction finance in the Ghanaian construction industry.

2.3.2 Road projects financing options in Ghana

2.3.2.1 Traditional Financing

Although not a strictly definitive term, the term is used here to mean financing arrangements of construction involving client (owner of the construction) engaging the tradesmen to fix the construction (Oyedele, 2013) and consequently paying the contractors for the works executed under the contract (Ndupuechi, 2003). The funds usually under the traditional financing come from tax receipts of the governments which are allocated in the government's budget (Ndupuechi, 2003). The public sector provides all facilities by to facilitate the realization of the projects. The client, in this case the government assumes all the risks inherent in the project and consequently manages the cash-flow (Oyedele, 2013). The risks inherent in the projects are covered by government guarantee other than political risks (Ndupuechi, 2003). Various procedures of contractor selection are available under the traditional method of financing construction projects (Banaitiene and Banaitis, 2006). Contractor selection is critical in construction project finance because of the cost bearing and its effect on project completion (Lingard et al., 1998). Adversarial contractor selection comes with time overruns that ultimately has financial implications on the project (Lingard et al., 1998). The following options are available under the traditional method:

- Open Tendering
- Restricted/Selective Tendering

- Negotiation

Open Tendering

According to Lingard et al. (1998), equal opportunity is provided for all interested contractors to bid under this method. Notwithstanding contractors duly registered with MWrWH are only qualified to bid for government contracts in Ghana (Amoah et al., 2012). After the submission of bids the lowest evaluated bidder is recommended by the consultants and the contract awarded to the bidder. It is argued that clients, mostly public clients get value for money using the lowest price as a yardstick for the selection of contractors. However, Oyedele (2013) and Lingard et al (1998) observed that desperate contractors in their quest to win contracts often underprice under this method and eventually fail to complete the project. This challenge led to a more streamlined method – selective or restricted tendering (Oyedele, 2013).

Selective/Restricted Tendering

Under this tendering procedure contractors initially go through a pre-qualification process (Lingard et al., 1998). Certain criteria govern the pre-qualification process. Clients usually consider previous experience, annual turnover among other things (Oyedele, 2013). The outcome of the pre-qualification process is to obtain a list of suitably qualified contractors to be invited to bid (Banaitiene and Banaitis, 2006). In that case the client would be dealing with fewer bidders (limited bidders) as compared to the open tendering. Just like any other method, the deficiency with this method is that contractors may collude to overprice and later on share the outrageous profits (Oyedele, 2013).

Negotiation

The collision identified with the selective tendering makes some clients opt to engage in negotiation with prospective contractors. The negotiation may either be between one or two firms pre-qualified (Lingard et al., 1998). The negotiated bidder with the lowest price is awarded the contract.

The traditional method has been identified to have numerous pitfalls and setbacks including the client bearing the risk of quality and maintenance since the specifications are under the control of the public agency (Oyedele, 2013). The method does not also promote innovations since cost are usually cut down in the name of lowest cost. Contractor's input is also limited since the designs are prepared before contractors invited to bid. These identified shortfalls led to a more innovative and modern methods (Oyedele, 2013).

2.3.2.2 Modern Methods

Modern methods evolved to combat the challenges associated with traditional financing (Ndupuechi, 2003). According to Oyedele (2013), modern methods are using innovative ways to delivering construction projects. They are usually private and public arrangements which normally results in mutual benefits (Oyedele, 2013). Accordingly many countries are now moving from the traditional financing to procuring infrastructure projects via these modern methods (Jefferies et al., 2002). The projects under these methods are financed on a limited recourse basis which are then operated by the private entities or transferred to the host government upon completion (Jefferies et al., 2002) depending on the framework arrangement. These methods include the following

- Design and Build

- Turnkey Projects
- Build, Own and Transfer (BOT)
- Build, Own, Operate and Transfer (BOOT)
- Construction Management
- Public Private Partnerships (PPP)

Design and Build (DB)

Under the DB concept one organisation designs and at the same time builds the structure (Oyedele, 2013; Ndupuechi, 2003). The selected contractors are briefed about the project and subsequently expected to produce their own designs. In view of this, the client requires in-house skills to prepare adequately the requirements of the projects (Ndupuechi, 2003). The contribution of the contractor creates innovations which sometimes result in cost savings (Ndupuechi, 2003). The contractor with the price in line with the client's budget is selected (Oyedele, 2013). This method is popular with clients as risk of the project is transferred primarily to the contractor (CIOB Research, 2010). Owing to the construction background of many contractors, the integration of design and build responsibilities may have adversarial effects on quality since there is the tendency for the firms to be oriented towards their core goal – construction (Ndupuechi, 2003). However, commenting on this Ndupuechi observed that these problems are surmountable with carefully structured bidding requirements and stringent performance criteria.

Turnkey Projects

A variation to the design and build is the turnkey projects. The major difference lies in the financial arrangements. Unlike the DB, financial arrangement is done by the contractor under the turnkey projects (Oyedele, 2013). Oyedele compares this to getting a Local Purchase Order to

supply a ready-to-use good which is paid upon receipt. A typical example is the construction of bridges at various accident prone traffic zones (i.e. Technology Junction)

Build, Own and Transfer (BOT)

Under such financing arrangements, the contractor is responsible for the finance, design, construction, operation and maintenance of a project for a concession, and then after the project transferred to the government (Client) often at no cost (Kwak et al., 2009). But Oyedele (2013) argued that the contractors may be financing the projects and may not necessarily be the builder. Owing to the concessionary periods this method is more suitable for infrastructure projects rather than buildings (Walker et al., 2000 cited from Jefferies et al., 2002).

Build, Own, Operate and Transfer (BOOT)

Recently, the use of BOOT in construction procurements has never been greater (see Jefferies et al., 2002). The BOOT provides governments with the opportunity to develop the infrastructure of the country without resorting to limited funds in the budget (Jefferies et al., 2002). Under this arrangement the client allows the contractor to own it for a period of time (Oyedele, 2013) before transfer is made. The BOOT project is first identified by the host government who then subsequently requests for proposals to have a particular project delivered under the BOOT system (Jefferies et al., 2002).

Construction Management

This is mainly used for relatively large or complex projects (CIOB Research, 2010). This method of project financing has not been widely embraced according to the same source. With this method a construction manager is appointed who would typically control the affairs of the

projects from efficient and economic application of resources to the realization of a constructed facility (Oyedele, 2013; CIOB Research, 2010). Consequently, the method has been noted to be the least adversarial form of procurement (CIOB Research, 2010).

Public Private Partnership (PPP)

Infrastructure project using either purely public or purely private delivery system has its own inherent challenges and hence not likely to be sustainable (Kwak et al., 2009). This problem compounded by government's inability to adequately implement infrastructure developments due to substantial public indebtedness (Ndupuechi, 2003) calls for a more innovative approach to infrastructure delivery (Badu et al., 2012). To overcome these problems, Public Private Partnership (PPP) has been recommended to incorporate strengths to both the public and private sectors (Kwak et al., 2009). Oyedele (2013) defined PPP as "a contract between the public sector and a private party in the development of infrastructure". However, Oyedele noted that the private entity assumes substantial responsibility in terms of financial commitment, technical and design risks in the terms of the contract. Adding to the above Kwak et al. (2009) assent that PPP has been instrumental and phenomenal in the delivery of public facilities in some countries. This is an important strategy especially when government is faced with the challenge of budgetary constraints; and hence tied between deferring the implementation of public facilities that come with social benefits and implementation (Ndupuechi, 2003).

2.3.3. Finance for Construction Projects

This subsection is focused on the financial options which are available to the construction projects usually involving the private sector. The section is divided into two; with the first addressing the organisations that are involved in the provision of finance for projects and the

latter part examines the funds that the organisations provide and the roles the categories of funds play as components of project finance structure.

2.3.3.1 Finance Providers

Investment in infrastructure represents a cost in the short-term and benefits in the long term. Invariably project finance problems are to obtain funds to bridge the gap between making expenditures and obtaining revenue. With the increasing demand for private financing the need for finance providers have never been greater. Consequently, more specializing and efficient tools for private finance are evolving (Ndupuechi, 2003; Akintoye et al., 2001). The under-listed are sources of finance for a construction project. The study by Ndupuechi (2003) shall form the basis for the discussion.

- Public Sector
- Commercial Banks
- Development Banks (Construction Banks)
- Project Participants
- Private Placement funds (Pension funds)

Public Sector

The intent of privately financed projects is to transfer risk to the private sector and hence the public sector's financial participation is usually met with skepticism as it defeats that very intent of private finance (Ndupuechi, 2003). However, certain projects obviously will require the financial commitment on the part of the public sector – questionable commercial viability projects (Ndupuechi, 2003). Ndupuechi observed that such commitments are usually in the form of guaranteed offtake contracts, subordinated loans, equity participation and also direct funding.

In other forms, the government commitments are also restricted to supporting the financing of transaction advisors for undertaking projects prior to the contractual arrangements with the private entities (Government of Ghana, 2011). Government involvement in financing of infrastructure is usually seen as a curb to natural monopolies and also more so, where the infrastructural services are seen as essential (Chan et al., 2009). Chan et al. (2009) noted that in Australia like many countries over the world, budget appropriation still remains the major source of finance for public infrastructure. Notwithstanding the general oversight role of legislative entity of authorization of the financing of public expenditure by governments, budget appropriation has a longstanding role in financing public projects (Chan et al., 2009). The budget appropriations are usually fixed amount approved to be spent by government up to the authorized amount. There is however, a limited provision for supplementation through additional appropriations. A consistent finding is that data on public sector using budget appropriation were not available in the studied countries; but where they were budget appropriation represented huge capital outlays for the financing of public infrastructure (Chan et al., 2009). However, there appear to be a shift in this trend as governments across the globe alike are increasingly drawing on capital market to finance infrastructure (Chan et al., 2009). As of 2011, the public sector in Ghana spends \$1.2 billion annually on infrastructure which represents about 7.5% of the GDP (Foster and Pushak, 2011).

Commercial Banks

Historically, commercial banks involvement in housing finance and other related construction projects are limited (Chiquir et al., 2009). The reason been that because of the core business accepting deposits and giving loans they are usually particular about capital lock up in long term investment (Anatsu, 2011). However, financial liberalization has changed the orientation of the

commercial banks (Anatsu, 2011). Consequently, commercial banks have become imperative in private financing and thus provide a huge percentage of the funds that are used for project financing especially in developing countries (Ndupuechi, 2003; Ngowi et al., 2006; Anatsu, 2011). According to Ndupuechi, banks serves as a bridge between the borrower and the lender by obtaining funds from the latter and borrowing it to the former at high interest rates. According to Lewis and Davis (1987) as seen in Ndupuechi (2003) the activity of banks can be categorised into three classes, in the relation to the currency used and the location:

- ❖ Domestic Banking. This generally includes the transactions between banks based in the same country and in that country's currency. Transactions of non-residents may also be classed as domestic when the transactions are in the currency of the country of residence.
- ❖ International Banking refers to the cross currency and cross border activities of banking where deposits are taken from non-residents (foreigners) or the banks lend to foreigners in the banks' domestic currency. Eurocurrency banking falls under international banking and is the borrowing or lending in currencies other than the domestic currency of the country in which the bank is located. These transactions normally involve large sums of money and the main currency involved is the US Dollar, hence the term 'Eurodollar'.
- ❖ Multinational banking involves banking transactions across a large number of countries and geographic regions (Robinson 1972).
- ❖ Commercial banks, whilst prohibited from taking equity positions, act as project finance lenders in order to acquire assets for their own portfolios. Through the use of warrants, or conversion features attached to debt, banks can sometimes obtain 'equity-like' positions, which yield higher returns than straight debt.

- ❖ Commercial banks may also act as intermediaries in project finance, generating fees by providing financial advisory services or underwriting debt issues.

Interestingly, local banks have continually shown interest in providing credit facilities to infrastructure project financing (Sheppard et al., 2006). This interest, is however constrained, as most of the local banks in Africa cannot increase funding largely because they are unreliably able to self-support themselves over the long-term (Sheppard et al., 2006). Ndupuechi (2003) also identified these limitations to project financing through commercial banks: bank exposure limits and the mismatch between short-term maturities sought by the banks and the longer term loans required for infrastructure. Notwithstanding Ndupuechi revealed that the limitation of bank exposure can be solved through syndication.

Development Banks (Construction Banks)

Because of the huge infrastructural needs in developing countries and given budget appropriations governments are unable to meet these infrastructural needs. Hence the need to resort to external funding for development projects; and key among these external sources is development bank (Ndupuechi, 2003). Early late study by Baum and Tolbert (1985) cited from Ndupuechi (2003) defined development projects as “a discrete package of investments, policies, and institutional and other actions, designed to achieve specific objectives (or set of objectives) within a designated period”.

Towards providing funds for construction several regional development banks were instituted including the African development bank (AfDB). The institutions have a defined mandate combined with their years of experience to promote financing of infrastructure (Goldin et al.,

2003 cited from Ngowi et al., 2006). Other examples of international development agencies are listed below in table 2.1

Table 2.1 Development Banks

Global
International Bank for Reconstruction and Development (IBRD), World Bank, Washington, DC
International Development Association (IDA), World Bank, Washington, DC
International Finance Corporation (IFC), World Bank, Washington, DC
Multilateral Investment Guarantee Agency (MIGA), World Bank, Washington, DC
International Fund for Agricultural Development (IFAD), Rome
Regional
Abu Dhabi Fund for Arab Economic Development (ADF AED), Abu Dhabi
African Development Bank (AfDB), Abidjan
Arab Bank for Economic and Social Development (AFESD), Kuwait
Asian Development Bank (AsDB), Manila
Caribbean Development Fund (CDB), Barbados
European Investment Bank (EIB), Luxembourg
Inter-American Development Bank (IADB), Washington, DC

(source: Ndupuechi, 2003).

Table 2.2 Multi-lateral development Banks spending on infrastructure

Year	1995	1996	1997	1998	1999	2000	2001	2002
Total	17.770	18.266	16.612	17.687	13.842	14.957	14.648	16.591
As % of Total commitments	33.984	24.708	36.130	40.998	31.205	34.147	34.171	38.973
ADB	3.424	2.849	1.903	2.337	1.752	2.655	2.261	2.879
AfDB	0.176	0.087	0.210	0.372	0.277	0.135	0.375	0.463
EBRD	1.404	1.631	1.077	0.874	0.916	0.792	1.164	1.458
EIB	2.465	2.425	3.067	3.483	2.993	3.735	3.552	4.401
IBRD/IDA	7.384	7.954	6.616	6.674	5.278	4.248	4.980	4.599
IDB	2.221	2.666	2.805	3.117	1.782	1.702	0.988	0.998
IFC	0.335	0.358	0.496	0.394	0.289	0.472	0.321	0.486
IsDB	0.219	0.148	0.295	0.260	0.351	0.468	0.475	0.445
MIGA	0.142	0.148	0.143	0.176	0.204	0.749	0.568	0.862

(Source World Bank cited from Ngowi et al., 2006).

However, given the huge infrastructure deficit in tandem with daily increase in infrastructure needs in developing countries these institutions have shifted their mandate from financing to investor promotion in the private sector through securitization of loans (Ngowi et al., 2006).

Project Participants

Construction finance takes several forms including combinations of promoters, lenders and others with distinct objectives but however tied together through a nexus of contract (Ngowi et al., 2006). These parties to the contract are able to provide funds for the project by way of providing equity (Ngowi et al., 2006; Ndupuechi, 2003). By so doing, participants of the projects

can invest in the project beyond their contractual interest and also ensures their commitment toward the success of the project (Ndupuechi, 2003).

Pension Funds

Recently, the pension funds have become dominant in the financing of private projects (Ndupuechi, 2003). According to Anatsu (2011), pension funds represent the most significant portion of domestic saving and hence make it more suitable for the finance of projects. What is more, the long-term asset of pension funds even makes it a perfect match for the investment in infrastructure projects (Anatsu, 2011; Ndupuechi, 2003). Many researchers have rightly advocated the increased involvement of pension funds in infrastructure projects (Ndupuechi, 2003). However with most African countries this involvement is limited in spite of all advocacy. The reasons for this limitation were looked into by Mutero et al. (2008) and he opined the following reasons;

- Trustees and their fund managers have inadequate knowledge of housing markets, especially low-income sub-markets, and are unfamiliar with the associated investment risks. Indeed, the pension fund community has scanty knowledge of housing micro-finance and the incremental construction process that is commonly used by the vast majority of households to improve their housing.
- The capital markets in developing countries are underdeveloped, limiting the investment options open to pension schemes.
- Some pension funds are too small to set aside funds for lumpy investments required to acquire housing and property assets.

- A number of private schemes face substantial liabilities in respect of members nearing retirement and therefore cannot afford to tie up their funds in illiquid investments such as housing finance.
- Pricing of pension funds often makes them unattractive for mortgage lending particularly in settings where government bond offers highly attractive yield.
- The institutional capacity is lacking to utilize pension funds for housing especially for the purpose of addressing the needs of low-income groups.

Notwithstanding these limitations Ndupuechi (2003) argued that pension fund financing of projects promote the economy locally given exchange rate risk and also provide a form of diversification of investments.

2.3.3.2 Sources of finance

Finance providers on road construction projects rely on various sources of finance to fund road projects. This section is, therefore, dedicated to addressing the sources of finance available to road projects whilst discussing also the merits and demerits of the nature of investments. The under listed sources of finance are usually explored by project financiers in road construction projects.

- Equity
- Debt
- Commercial Bank Loans
- Bond Issues
- Commercial Opportunities i.e. Road Tolls.

Equity

Ndupuechi (2003) defines equity as “risk capital that is provided by investors who in return receive payments (dividends) in proportion to the amount of equity provided”. To this end the amount received by investors is dependent on the profits of the business venture. The investors only received their share of the profit after all debt obligations are honoured. This, Ndupuechi refers dividends paid to shareholders as been subordinate to all debt and financial obligations of the project.

Equity as a major source of project finance has gained currency in recent times. In a study to unearth how the Sub-Saharan African region can attract more project finance in aiding its infrastructure development, Sheppard et al. (2006) noted that infrastructure projects that involve private participation often usually financed using a mix of equity and debt. The providers of equity include the project sponsors, institutional lenders, insurance companies and all participants in the projects (Gardner and Wright, n.d.; Ndupuechi, 2003). It is worth noting that equity is often raised in the stock markets and from other specialized funds (Ndupuechi, 2003). Equity is mainly raised through the following sources: Domestic capital market and equity placement and International equity market. However, Global capital markets have been identified to have the potential of funding all economically viable projects (Ngowi et al., 2006). In either source, this can be achieved using a variety of structures as opined by Gardner and Wright (n.d.):

- Ordinary share capital; and/or
- Shareholder loans, which can provide two advantages, being (1) a tax shield through tax deductible shareholder loan interest and (2) an optimised returns distribution profile,

where shareholder loan repayments of interest and principle are not restricted by balance sheet retained earnings; and/or

- A bank-funded equity bridge loan (which will be guaranteed by the Sponsors and typically repaid at project completion), the use of which optimises shareholders' return profiles through delaying the timing of equity contributions to the project.

As with all finance instruments, there are pitfalls associated with this source of finance. Mostly, excessive and wide distribution of shares often limits the powers within the ranks of the subscribers of the equity resulting in project being left at the mercy of the contractors. This problem was pervasive in the Eurotunnel projects as pointed out by Ndupuechi (2003). Eventually, the project overran its cost to nearly a hundred percent (100%).

Debt Financing

Undoubtedly, the common form of finance available for most infrastructure works and for that matter road projects is Debt; accounting for 81% of project finance in 2009 (Dealogic, 2009 cited from Annamalai and Jain, 2013). Ndupuechi (2003) identified various forms of debt available to project stakeholders ranging from senior loans, subordinated loans through to bonds and soft loans. Debt has gained a wider recognition in project finance because of its perceived lower risk, lower return form of investment (Ndupuechi, 2003). The variety of mix of products available for project finance usually depend on several considerations including the sector, jurisdiction, project size, and sponsor profile amongst others (Gardner and Wright, n.d.).

Despite the various types or forms of debt, there are two main broad classifications of debt – senior and subordinate debts. According to Ndupuechi (2003) senior debt is ranked first and can

take the form of either secured or unsecured loans. Akintoye et al. (2001) argued that senior debt is the main form of capital for most project finance. Where a single project requires huge financial commitment such that a single bank lacks the ability to provide, syndicated loans becomes the option. Under syndicated loans, several banks pool resources and provide the loan facility with one of the banks as the main arranger (Annamalai and Jain, 2013; Ndupuechi, 2003). However, in developing countries, the numbers of syndicates in syndication are higher. This, Annamalai and Jain (2013) explained that it serves as a cushioning to risk among the investors. Higher syndicates can also be said to be an increase in interest of investors. The disadvantage is that complexity of arrangements could increase when higher numbers are involved (Ndupuechi, 2003).

Commercial Bank Loans

Few years ago have seen the rise of commercial banks engagement in project finance. Commercial banks have become instrumental amassing experience in this discipline (Ndupuechi, 2003). The collapse of the syndicated loan market as a result of Global financial crisis makes commercial bank loans alternative to syndicated debts (Gardner and Wright, n.d.). Gardner and Wright (n.d.) opined two main sources of commercial bank loans – international and local banks.

However, most local banks lack the capacity to fund infrastructure projects (Sheppard et al., 2006). Commercial bank loans structures usually have two project phases; and for some projects the loan agreements are separated with one bank providing loan facility for the construction phase and the other for the operational phase (Ndupuechi, 2003). Standby facility is inherently built in commercial loans structure and this facility is not released early enough to the project.

The project company has access to a predetermined sum to the standby facility (Ndupuechi, 2003). The project company incurs costs for this assurance by the lenders.

Ndupuechi (2003) highlighted some of the difficulties in mobilizing commercial bank loans. He mentioned that despite its preferred choice as major funds of infrastructure, their participation is becoming limited. By this end, Ndupuechi (2003) alluded to the following reasons as the major difficulties in mobilizing commercial loans.

- Generally lenders are cautious, as although they face the same risks as equity providers there is no upside potential. Their return is normally fixed to the interest payments on the principal. There is a great effort on the part of the lenders to reduce project risks by negotiating the conditions under which they will participate.
- Often commercial banks set limitations on their risk exposure in developing countries and are reluctant to provide long-term funds that can match the growing needs of infrastructure projects. There may exist also a high level of implementation risks, foreign exchange risks and high inflation risks.
- The existence of a large public sector external debt level compounded by under developed domestic bond markets in certain countries could also be a deterrent to lenders to participate in projects in such countries.
- The measure of a country's central bank's ability to make foreign currency available to service debt is one of the factors that determine the credit rating given to a country by credit rating agencies such as Standard and Poor (S&P) or Moody. These greatly affect the debt raising capacity of projects in these countries. Large external debt or political

instability are factors that could contribute to a low sovereign state credit risk rating which makes it difficult for projects to access cross-border capital markets and international funds.

- Normally, as developing domestic markets cannot mobilise the large volumes of long-term debt required for most projects, funds are sourced from foreign lenders. This however requires a consideration of risks that are outside the domain of the private sector such as interest rate risk and availability of foreign exchange mentioned previously.

Bond Issues

In other jurisdictions bond continually serves as the major form of financing instrument for most infrastructure projects (see for instance Gardner and Wright, n.d.). Recently, bond market has become attractive as an alternative option of project financing given its availability of long tenor, fixed rate funding etc. (Gardner and Wright, n.d.; Akintoye et al., 2001). Additionally, bonds present an attractive alternative source of liquidity for refinancing existing project finance loans (Gardner and Wright, n.d.)

Chan et al. (2009) defined specific-purpose bond as bonds issued to finance a particular project and the debt repaid from the income generated by the project. In the event where the project is not economic but instead social infrastructure like hospitals, specific-bond has still been found to be used there. In this case the mode of debt repayment is taxation (Chan et al., 2009).

A major drawback of bond financing is that of its inefficiency for small transactions (Akintoye et al., 2001).

Commercial Opportunities (Road Tolls)

Innovative financing requires transcending the traditional thinking of infrastructure financing and including scope for commercial innovation to allow inflows in financial packages for road projects. Project companies must embrace the philosophy that project finance is a source of revenue and consequently shift from the idea that project finance is a source of fund for realizing projects (Ndupuechi, 2003).

In some part of the world, there are growing trends in highway investment where private individuals invest into road construction and others also purchase through road tolls.

2.4 DRIVERS OF INNOVATIVE ROAD INFRASTRUCTURE FINANCING

There has been increasing interest of the private sector towards innovative financing (Akintoye et al., 2001). Several factors serve as impetus to the financing of road infrastructure. A lot has been discussed by several authors. The works of these authors – Liu and Wilkinson (2011) and Gardner and Wright (n.d.) shall form the basis of the discussion.

2.4.1 Faster delivery of infrastructure project

The deplorable state of most road networks in the country poses threats to human lives and economic activities. Consequently maintaining and reconstructing requires faster delivery methods. The hazards associated with construction of road infrastructure – respiratory problems make it even more imperative to accelerate the construction of road infrastructure projects. PPP strategies have been identified to aid in the acceleration of public facilities by governments without providing funding upfront (Liu and Wilkinson, 2011). Thus, the use of innovative finance accelerates infrastructure project (Chan et al., 2009).

2.4.2 Identifiable risk and better allocation of risk

An unidentifiable and unmitigated risk has the potential of jeopardizing the stability of project (Gardner and Wright, n.d.). Under PPP arrangements this burden of risk relating to financing, designing, building, etc. are partially or wholly shifted to the private sector as they are seen as better managers of risk than the public sector (Liu and Wilkinson, 2011). Given the huge financial commitments and the risks associated with road infrastructure projects, this better risk allocation inherent in project financing has been identified as significant driver for the its adoption in financing road projects.

2.4.3 Accessible financing

The major requirement and a significant driver of infrastructure is access to funds for the project. Project financing is noted for incentives to provide additional sources to realize projects. Liu and Wilkinson (2011) argued that private sector do not achieve additional revenues but rather are good managers of public assets to maximise its revenue potentials. However, project financing always imposes financial and managerial disciplines on the private sector; and typically in a non-recourse projects, the lenders are always at the losing end if part of the project fails (Chan et al., 2009). This provides opportunities to align incentives of minimizing risks associated with the projects and accordingly seeks indirect credit supports in the form of guarantees, etc. (Chan et al., 2009).

2.4.4 Improved quality of services

The private sector is noted for delivering quality services more than the public sector. More so, the project financing framework arrangements allows space for innovation throughout the

project cycle (Liu and Wilkinson, 2011). This innovation guarantees end-users improved quality of services than the public sector. Moreover, road projects are supposed to last for longer periods and also needs continuous maintenance in order to effectively function. Consequently quality is of essence in road construction and cannot be compromised. A study by Liu and Wilkinson (2011) in New Zealand established that provision of public assets by private sectors serves to solicit private consortia with experience in maintaining and operating public facilities. Indeed receiving better services has been identified as one of the drivers of private financing of infrastructure projects.

Moreover, the bundling of several activities – designing, construction, financing, operating, etc. altogether provide value for money as compared to contracting different parties to undertake the respective activities as practiced under the traditional procurement approach (Chan et al., 2009).

2.4.5 Political Stability

For every public private partnership to thrive political stability is a pre-requisite. Nationalisation and expropriation of foreign firms and private firms some years back still haunts many investors looking at investing in the sub-region. Political risk cannot be mitigated by the insurance markets (Gardener and Wright, n.d.). However, in public private partnership arrangements political risks are contractually borne by the government. Such arrangements and other financing products available from multilaterals and export credit agencies continually push innovative financing to the lime light.

2.4.6 Demand need

There is increasing pressure on governments over the world to meet the infrastructural needs of the ever growing population. This infrastructure needs far outpace the traditional source of financing available to meeting these needs. PPP has been identified as a vehicle for delivering most of the public demand for services such as road systems (Wilson et al., 2010). Ultimately, investors also look at the demand for the services before finally deciding to provide the funds for the project (Gardner and Wright, n.d.).

2.4.7 Cost effectiveness

Design, construction, financing, operating and maintenance of assets are usually under one package in PPP arrangements. Thus, there is an incentive to adopt strategies and innovations that possibly ensure low construction cost that consequently leads to a reduction in the whole-life cycle cost (Chan et al., 2009).

2.5 BARRIERS TO INNOVATIVE FINANCING OF ROAD INFRASTRUCTURE

Despite the growing literature body on innovative financing, it still faces obstacles or barriers that impede the successful implementation or adoption of innovative financing (Badu et al., 2012; Liu and Wilkinson, 2011). This section highlights on the major barriers to innovative financing in the road sector.

2.5.1 Contractual Complexity

The contractual arrangements of project financing are extremely complex and can take longer time to structure, negotiate and document project financing (Chan et al., 2009). Lenders usually bear higher risks in project financing than the traditional approach. Hence, the cost of capital are

usually high (Chan et al., 2009). The complexity of its structuring also more often than not increases the upfront fee. There is also information asymmetry that allures to the benefit of the agent – private sector, than the principal – public sector of the project. Consequently, the private sector has the scope to inflate investment in non-competitive process (Chan et al., 2009).

2.5.2 Unfavourable economic and commercial conditions.

Private investors obviously look at certain indicators before deciding on the countries to invest. Palpable among such indicators is the overall economic growth of the economy. Consequently, Liu and Wilkinson (2011) argued that poor prospects for economic growth adversely affect the confidence of private sector to enter the local market. They further opined that, other times too, the project fundamentals cannot justify the involvement of the private sector. Moreover, the perennial inflation problem serves as disincentive to financial institutions to invest into infrastructural projects (Badu et al., 2012) including roads.

2.5.3 Transaction costs

The definition by Chan et al. (2009) is adopted “transaction costs include contracting and negotiating costs, the cost of arranging finance, as well as (after the formal contract agreement) monitoring, renegotiating and termination costs”. Significant amounts are thus expended in developing proposals, tendering for projects, etc. This can either be borne by the public or private sector. In either case, the end result is that the tax payers finally bears the cost or is reflected in user charges (Chan et al., 2009). This is often the critique against the adoption of project financing globally.

2.5.4 Reduced Public accountability

Governments are supposed to be accountable to its citizenry. One of the key ways of judging the performance of governments is to scrutinize the balance sheets. However, most economic PPP infrastructure projects are not recorded on government's balance sheet (Chan et al., 2009). Consequently, the public and investors alike are denied of key financial information. In such cases, how funds are spent; and also issues on the efficiency and effectiveness in the allocation of funds to reduce infrastructure financing deficits (Badu et al., 2012).

2.6 ADDRESSING THE BARRIERS TO INNOVATIVE FINANCING OF ROAD PROJECTS

The above barriers identified are surmountable but will require the implementation of strategies and policies. And it is only by addressing these barriers that innovative financing option be fully realised. A cursory look at extant literature revealed the following strategies for addressing the barriers to innovative financing.

2.6.1 Project Risk Allocation

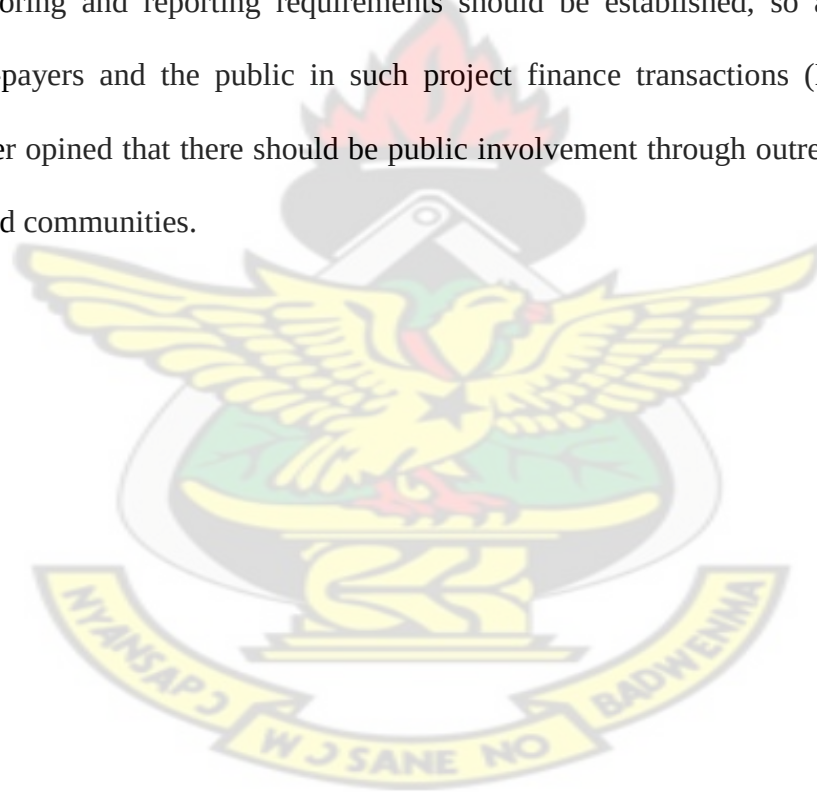
Undoubtedly, many investors and private financiers are scared away by certain inherent risk in project financing. Aligning the incentives to manage project risks is a way of arresting this issue and thus improving road financing. As a rule of thumb, those with the competency to manage risk are required to handle it. Aligning the incentives suggests that contractors bear construction risks, operating firm bear operational cost whilst government the risk of its own creation – regulatory uncertainty.

2.6.2 Require Competitive bidding process

Most project financing projects are awarded on procedures other than competitive bidding. However competitive bidding should be required for project financing projects in order to establish a level playing field among prospective investors to ensure value for money i.e. best possible value (DiNapoli, 2013).

2.6.3 Ensure full transparency and accountability

Detailed monitoring and reporting requirements should be established, so as to protect the interest of tax-payers and the public in such project finance transactions (DiNapoli, 2013). DiNapoli further opined that there should be public involvement through outreach and hearings with the affected communities.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In order to achieve the research aim and objectives, this chapter presents the philosophical assumptions underpinning this research as well as finding the best methodology to answer the research questions raised. This chapter threw more light on the research strategy, research design and development process used prior to administering the questionnaires. The chapter also defined the sampling technique and the characteristics of the sample size; including the statistical tools adopted for the data analysis.

3.2 RESEARCH STRATEGY AND DESIGN

In order to answer the research problem, it is of paramount essence to technically disentangle relationship between or among variables in a situation and analyze the relationship devoid of external influences (Nenty, 2009). Consequently, Nenty (2009) opines that research design involves the procedures through which we can explore and analyze the relationship among the variables involved in our problem and consequently to argue the preference of particular procedures over others. Thus research design is a master plan that shows how the research is to be conducted. However, this research adopts a questionnaire survey in an attempt to examine the innovative financing approaches to road construction delivery. According to Janes (1999), the only available way of getting the current picture of a group, profession, organisation, etc. is a survey. Consequently, Cresswell (2005) cited in Ayyash et al. (2011) argues that survey helps to provide trends in the population. In addition, survey questionnaire has been identified to be less expensive and not time consuming to conduct (Ayyash et al., 2011).

The explanation to the direction of the researcher towards the conduct of research is very imperative (Bryman, 1992; Baiden, 2006). Naoum (1998) defines research strategy as the enquiry of research objectives. Accordingly, Baiden (2006) asserted that, the three main types of research strategies are quantitative, qualitative, and triangulation. However, the choice to adapt any particular strategy depends on the purpose of the study, the type, as well as availability of information for the research (Naoum, 1998 cited from Baiden, 2006). Hence, this research adapts a quantitative strategy.

3.3 POPULATION, SAMPLING AND SAMPLING TECHNIQUE

Population in research methodology is understood to be objects, subjects, phenomena, cases, events or activities specified for the purpose of sampling (Brynard and Hanekom, 2005). Also, Population refers to a group or units of interest located in a geographic area of interest during the time of interest (Taylor-Powell, 1998). Consequently, this research focused on the construction industry in the Accra and Kumasi Metropolises with spotlight on the road construction industry.

The population in this study was the stakeholders in the road construction industry - Public sector, Private sector, Contractors, among others. Sample refers to using a part to represent a whole. However, Taylor-Powell (1998) argued that sampling may not be necessary if the population is small. Notwithstanding,

Owing to the nature and kind of information needed; and also the resources available for this research surveying the entire population is not feasible. Accordingly, sixty stakeholders were targeted.

Purposive sampling was used to select the sample within the population. Purposive Sampling is a sampling technique whereby the researcher decides who to be engaged in the research. This was selected because it allows information-rich issues that are important to the study to be added and also focus on specifics rather than general (Tuuli *et al.*, 2007; Taylor-Powell, 1998). The choice was based on contractors with road construction experience, specifically those in the A1 and A2 and D1K1 and D2K2; private sector with relative experience in road financing and the public sector in charge of delivering road projects. It is considered that people with such knowledge shall contribute immensely to the problem at hand.

3.4 SOURCES OF DATA AND DATA COLLECTION

Both primary (field survey) and secondary (literature review) data were employed for the study. The data were collected to cover every aspect of the research. Neville (2007) argued that research should contain empirical research data. Thus primary data are indispensable in the conduct of any research endeavour. The primary data sources in this research included the population aforementioned.

Over the years, scientific methods of data collection have come to dominate the field of evaluation (Taylor-Powell and Steele, 1996). According to them, these methods seek to establish cause-effect relationships and provide quantitative data. Data were collected through a questionnaire survey targeting contractors. The response structure on the questionnaire was basically close-ended questions. Closed-ended questions were adopted because of its simplicity and ease in analysis.

The questionnaire sought to establish, the innovative ways of delivering road construction projects with a focus on urban roads. The questionnaire was divided into two thematic areas,

with Section A relating to the demographic variables of the respondent. Section B included questions on the innovative financing approaches, challenges, barriers among others to innovative financing. A 5-point likert scale was adopted to rate these factors.

3.5 DATA PRESENTATION AND ANALYSIS

The retrieved questionnaires were coded and analysed using statistical tools such as the Statistical Package for Social Sciences (SPSS) 16.0 and Microsoft Excel. The interpretation of the data was thus done by these two tools. To elucidate the discussion in this discipline, the data obtained were subsequently presented graphically and also in tabular form. Information involving the background of respondents were presented in pie charts and bar graphs. The dependent variables were analysed using descriptive and inferential statistics – Standard deviations, mean score rankings, Relative Importance Index (RII) and independent t-test. The outcome of the study was then assessed with the research objectives and questions.

3.6 ETHICAL ISSUES

This research was compiled with principles which aimed at protecting the privacy of every individual who, in the course of the research work was requested to provide personal or commercially valuable information about themselves (hereinafter referred to as a subject of the research). Before an individual becomes a subject, the person was notified of, the aims, methods, anticipated benefits and potential hazards of the research.

No person becomes a subject unless the person is fully abreast or cognizant of the notice referred to in the preceding paragraph.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter presents the analysis of the primary data collected from the forty-three (43) road construction stakeholders (i.e. Contractors, Consultants, Public Sector and Private Sector) in Ghana in the Accra and Kumasi Metropolises. Respondents were purposively sampled from various road construction stakeholders in the aforementioned metropolises. This chapter provides the analysis and discussion of the data collected to explore innovative financing of urban road projects in Ghana. The analysis is hinged on the objectives of the study, that is, to identify the inherent challenges to innovative financing of urban road projects in Ghana, to examine the drivers of innovative financing of urban road projects.

This chapter also presents the results of the analysis and discussions in the form of texts, figures and Tables. The chapter is organized as follows; Background information of Respondents and analysis of dependent variable. Out of the sixty (60) questionnaires administered, forty-three (43) were completed and returned representing 71.67%. The analyse was based on the 71.67% questionnaires completed and returned. The high response rate of 71.67% can be attributed to the fact that questionnaires were administered and successive follow-ups thereafter.

4.2 BACKGROUND INFORMATION

This section provides discussion on the background information of respondents such as the profession, level of educational qualification, job position, and years in practice amongst others. Such analyses are imperative because the background of the respondents is to elucidate the reliability of data collected; and eventually the findings of the study.

4.2.1 Profession of Respondents

The study was limited to major road construction stakeholders usually involved in project financing of urban roads. Respondents in these categories were Contractors, Consultants, Public Servants, Civil Servants, Private Investor, etc. The reason underpinning the selection of these respondents was that innovative financing involves usually the private (Private Investor) and the public (Government) sectors which is realised through contractors mostly under the supervision of consultants. Thus their input to the exploring of innovative financing was imperative. Out of the forty-three retrieved questionnaire, the following highlights the breakdown of the profession of respondents (see Fig. 4.1). Majority were civil servants representing 44.18%, Public Servants also made up of 6.98%, Contractors also represented 11.63% likewise Private Investor. Whereas Consultants represented 18.60%, Personal Bankers constituted 6.98%. Further analysis shows that the respondents in the public sector constituted 51.16% ($44.18 + 6.98=51.16$), Private Sector formed 18.61% ($11.63 + 6.98=18.61$). Whereas Contractors constituted 11.63%, Consultants made up of 18.60 of the respondents.

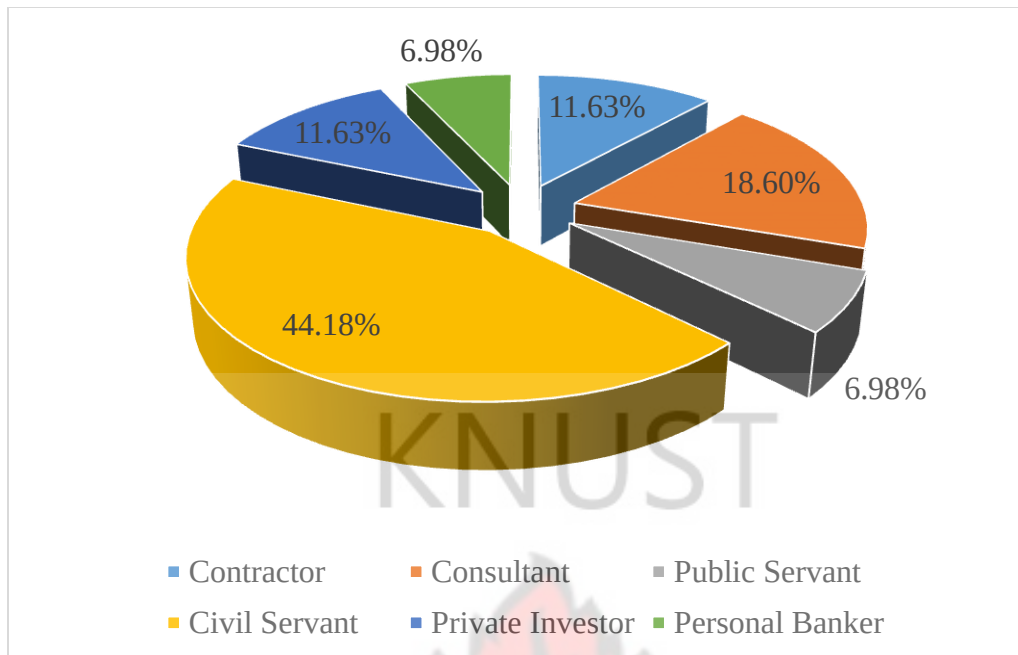


Fig. 4.1. Profession of Respondents

4.2.2 Job Position of Respondents

The job positions of respondents ostensibly correlate with their level of involvement in decision making and implementation of policies within any establishment. Consequently, respondents were asked to indicate their job positions in order to give credibility to the kind of response that shall be elicited. It is apparent from Fig. 4.2 that Chief Executive Officers were 6, Managing Directors 4, Financial Accountant 7, Quantity Surveyor 3, Architect 1, Structural Engineer 4, Civil Engineer 11 and Construction Manager 7.

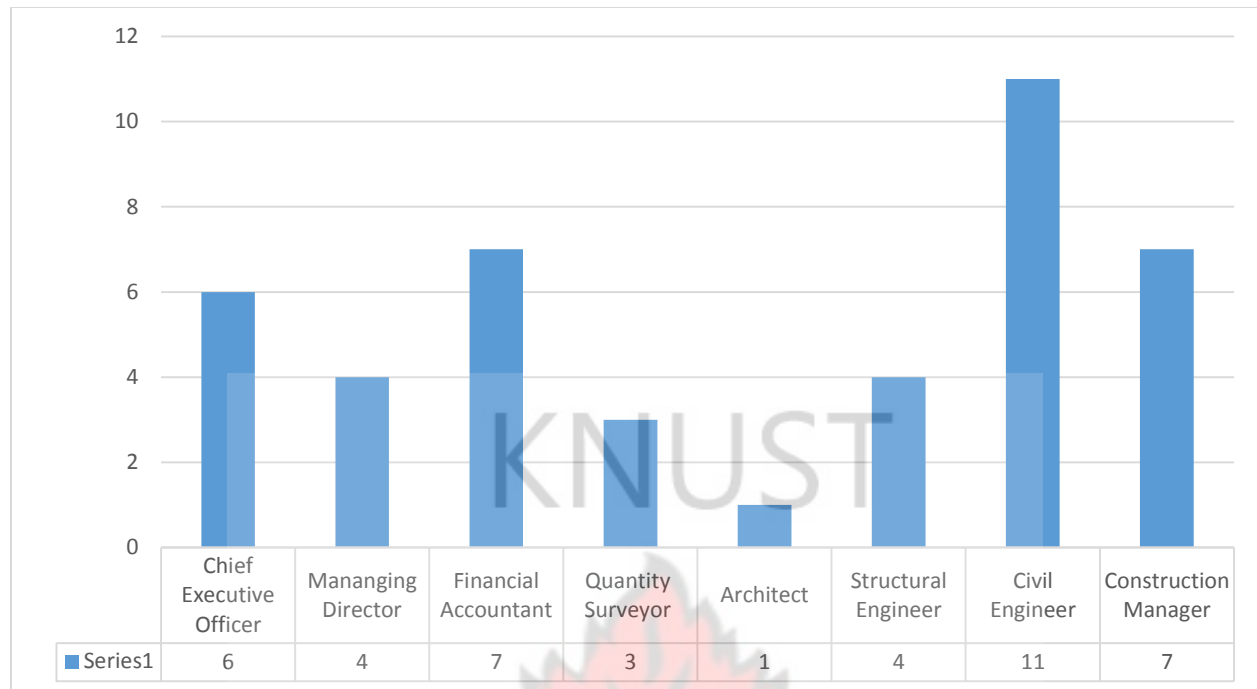


Fig. 4.2 Job Position of Respondents

4.2.3 Academic Qualification of Respondents

The question was posed to find the educational qualification of the respondents and since the level of this qualification to a larger extent determines a position in the firm and hence their involvement in construction decision such as issues on health and safety policies. Such involvements determine the quality of responses given. A cursory look at Figure 4.3 reveals that Majority of the Respondents are Bsc degree holders, followed by MSc holders.

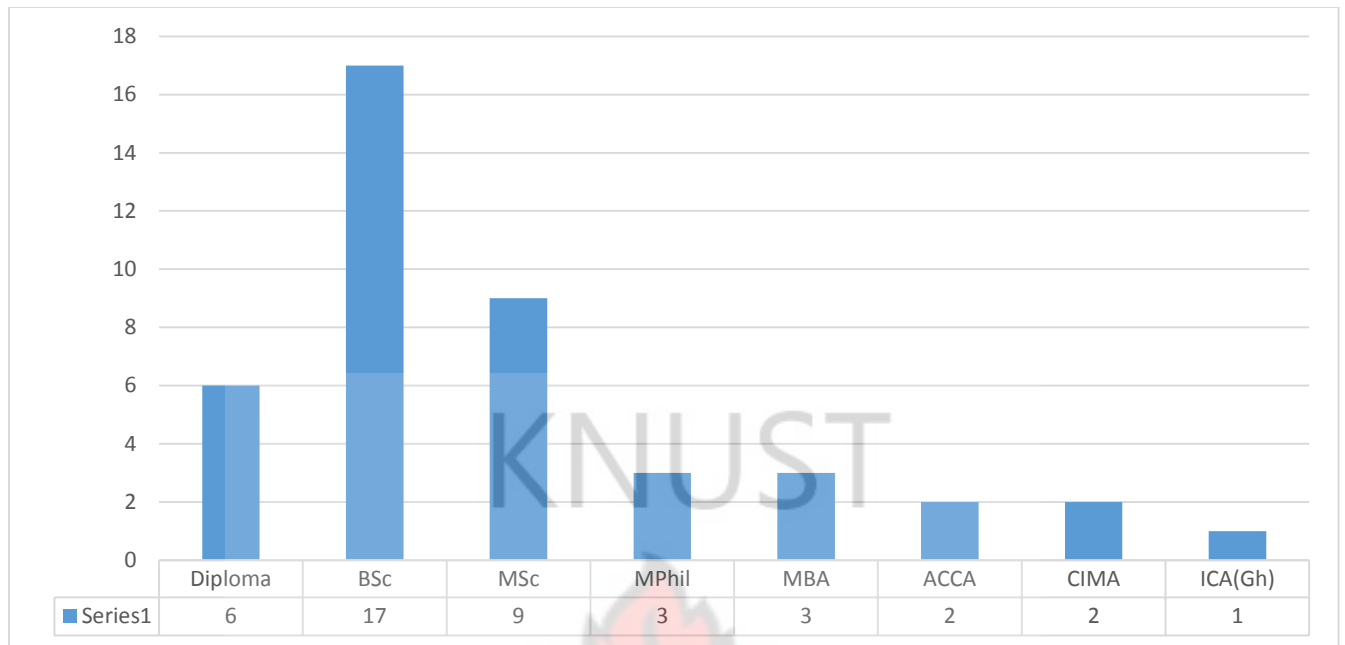


Fig. 4.3 Academic Qualification of Respondents

4.2.4 Years of Experience in Road construction

The intention of this question was to ascertain working experience of respondents in road construction. This information will give relevance to the quality of answers given out by the respondents since it is more likely to have engaged in a number of projects with different procurement approaches, encountered different challenges (financial) and the decisions taken. Hence, this rich experience is imperative in the filling of the questionnaires. Tables 4.1 present the analysis on the working experience. Obviously, from the Table majority of the respondents have less than 10 years working experience. 16 respondents have 10 to 20 years experience whereas 4 have more than 20 years worth of experience.

Table 4.1 Working Experience of Respondents

Years	Frequency	Valid Percent	Cumulative Percent
Less than 10 years	23	53.5	53.5
10 to 20 years	16	37.2	90.7
Above 20 years	4	9.3	100.0
Total	43	100.0	

4.2.5 Involvement in Project Finance projects

The thrust of the study is to explore innovative financing of road construction projects. Hence, respondents were asked to indicate if they have been involved in any road projects financed through project finance or any form of financing aside the traditional method. 67.4% indicated Yes whereas 32.6% indicated No (Refer to Table 4.2).

Table 4.2 Involvement in Project finance

	Frequency	Valid Percent	Cumulative Percent
Yes	29	67.4	67.4
No	14	32.6	100.0
Total	43	100.0	

4.3 ANALYSIS OF DEPENDENT VARIABLES

The statistical analyses undertaken encompass relative importance index, mean score, standard deviation and independent t-test. They were altogether used to assess the various variables under the different sub-sections. Specifically, the independent t-test was used to analyse the challenges to innovative financing. The procedure, findings and relevant discussions are as follows.

4.3.1 Construction Financing Projects Options

It was imperative to establish from the respondents the commonly used modern methods of innovative financing of road construction projects in Ghana. Respondents were thus asked to rate the approaches or methods identified from literature to indicate their level of occurrence. In the analysis of the extent of their agreement to the various methods in order to ascertain the commonly adopted modern methods, the Relative Importance Index (RII) together with standard deviation and mean score was used. The aim of the analysis was to establish the relative occurrence of the various methods in road construction projects (for e.g. Fugar and Agyakwah-Baah, 2010). The score of each factor is calculated by summing up the scores given to it by the respondents (for instance see Badu et al., 2013; Fugar and Agyakwah-Baah, 2010). For a five-point response item, RII produces a value ranging from 0.2 – 1.0 (cf Badu et al., 2013; Ugwu and Haupt, 2007). Based on the five-point likert scale, variables with Mean greater than 3.5 are considered important. In the calculation of the Relative Importance Index (RII), the following formula was used (Badu et al., 2013):

$$RII = \frac{\sum W}{A * N}$$

Where, W: weighting given to each statement by the respondents and ranges from 1 to 5;

A – Higher response integer (5), and N – total number of respondents. The standard deviation indicates the level of consistency of the responses given.

Table 4.3 Modern Methods of Urban roads delivery

A. Modern methods of Urban Roads delivery	Weighting	RII	Mean	Standard Deviation	Ranking
• Construction Management	155	0.721	3.60	1.024	1
• Public Private Partnership	150	0.698	3.50	0.910	2
• Design and Build	145	0.674	3.40	1.176	3
• Private Finance Investment	139	0.647	3.20	1.493	4
• Build, Own and Transfer	132	0.614	3.07	1.100	5
• Build, Own, Operate and Transfer	127	0.591	3.00	1.253	6
• Turnkey	97	0.451	2.30	0.978	7

The highest rated modern method of infrastructure delivery in Ghana was Construction Management. Construction Management had a Mean of 3.60 which can be deduced that it is one of the frequently used modern methods of infrastructure delivery. Although it is a modern method, the significant weighting attached to it by the respondents seem to suggest the method has already gained root in the procurement of urban roads in Ghana. The findings agree with the study by CIOB Research (2010) that observed that the method is usually used for relatively large projects. Apparently, urban roads involve huge contract sums and can therefore be termed as relatively large. The plausible reason underpinning the adoption of the method is the least adversaries the method presents (see CIOB Research, 2010). However, it is interesting to note that the method had a standard deviation more than (1.024) suggesting inconsistency among the

respondents. The inconsistency can be attributed to the diverse background of respondents (Contractors, Public Sector, Private, etc.).

Public Private Partnership was the second highest ranked method of infrastructure delivery with a Mean of 3.50. Thus it can be concluded also to be one of the frequently used modern methods in the procurement of urban roads. This method has become imperative owing to the challenges purely public and wholly private procurements present. Hence, the method was introduced to strengthen the advantages of the two methods and surmount the problems they present also. The method has been instrumental and phenomenal in the delivery of public facilities in some countries (Kwak et al., 2009). The benefits the method presented may be the plausible reason for its adoption in the procurement of roads in Ghana.

The findings revealed that the other methods have Mean values less than 3.50 suggesting that they are rarely used in the procurement of urban roads in Ghana. Notwithstanding, Design and Build had a Mean value of 3.40 indicating that it is sometimes adopted in the procurement of urban roads. However, a standard deviation of more than one suggests variability in the data. Interestingly, the variant form of Design and Build – Turnkey – was rated least. The plausible explanation lies in the financial arrangements. Urban road projects require huge financial commitment and most contractors are not in the capacity to deliver such projects under turnkey.

4.3.2 Drivers of Innovative Finance of Road Infrastructure Projects

As part of the endeavour it became imperative to establish the drivers of innovative financing of urban roads in Ghana. It considered that knowledge on this shall elucidate the level of influence of the drivers on the innovative financing of roads. Following the literature review a number of drivers were identified. Subsequently, the respondents were asked to rate the level of

significance of the drivers using a likert scale. As already established, variables with mean of more than 3.5 is deemed significant. From the results all the drivers had a mean value more than 3.50 indicating how significant they are to the driving of innovative financing of roads (see Table 4.4).

Table 4.4. Drivers of innovative financing of urban roads

B. Drivers of innovative financing	Weighting	RII	Mean	Standard Deviation	Ranking
• Accessible financing	176	0.82	4.0930	.97135	1
• Cost effectiveness	172	0.80	3.9762	.86920	2
• Improved Quality of services	170	0.79	3.9535	.92462	3
• Faster delivery	167	0.78	3.8837	1.05129	4
• Identifiable risk and better risk allocation	165	0.77	3.8372	.94944	5
• Demand need	156	0.73	3.6279	.92642	6
• Political Stability	153	0.71	3.5581	.98325	7

Accessible Financing

Accessible Financing was the highest ranked amongst the seven identified drivers with a mean value of 4.093 and a standard deviation of 0.971. The major requirement of projects and thus road projects is access to finance. Because of the huge budget constraint on the part of government to provide funds for projects, innovative finance provide the option of getting easy access to finance. Hence, it was not surprising, the driver was ranked the highest. Since the lenders (Private sector) are always at the losing end in the event of the failure of the projects, there is always the onus on their part to minimize risks by securing additional sources of credit

(Chan et al., 2009). These credit provide finance to the projects which could not otherwise have been easily provided by the government. The standard deviation of less than one indicates the level of agreement or consistency of the data.

Cost Effectiveness

Usually projects financing through any of the identified modern forms of roads procurement; the design, construction, financing, operating and maintenance of assets are usually under one package in the arrangements. Thus, there are huge incentives to adopt strategies that would minimize the life cycle cost of the projects (Chan et al., 2009). Accordingly, the driver was ranked second after accessible financing, with a mean of 3.976 significantly above the hypothesized mean. However, it follows a conventional thought that since the revenue are been provided by the private sector, financial and managerial responsibilities are imposed on them to better manage the assets well.

Improved Quality of Services

Conventionally, the private sector has been noted to delivering quality of services than the public sector. More so, in road projects the expected life span is usually longer. In order to effectively and successfully achieve this long life span brings the element of quality. Continuous maintenance is imperative in ensuring the desired life span is achieved. It has, however, been noted that innovative forms of roads delivery encapsulate in their arrangements the space to be innovative and that element of innovative assures end-users improved quality of services than the traditional procurement methods. Consequently, the finding indicate that improved quality service is a significant driver in innovative financing of roads in Ghana; being ranked third with a mean value of 3.95.

Faster Delivery

In Ghana, the deplorable state of urban road infrastructure is exigent and requires faster delivery approaches of roads procurement. The health effects associated with road construction even makes it more imperative to accelerate the construction of road projects. Many urban road projects have been started and realised time overruns. All things being equal, with the upfront funding or easy access to financing and the level of expertise in the management of these funds the innovative form of roads delivery is expected to deliver roads faster than the traditional methods. In that, most of the processes under the arrangements have been streamlined. Studies by Chan et al. (2009) and Liu and Wilkinson (2011) observed that innovative financing ensures faster delivery of projects. Consequently, the driver was considered significant by the respondents. However, a standard deviation of 1.05 showing a lot of variability in the data.

4.3.3 Barriers to Innovative Financing of Road Projects

As part of its specific objectives, this research considered it imperative to establish from the major stakeholders the barriers to innovative financing of road projects. It considered also that knowledge of this kind would provide some basis to have an insight into the barriers to innovative financing amongst the major stakeholders. Resolution of such barriers would invariably lead to the integration of innovative financing strongly into our system. Subsequently, the respondents were asked to rate the level of severity from 1 to 5, where 1 represents not very severe, 2 represents not severe, 3 represents moderately severe, 4 represents severe and 5 represents very severe.

In evaluating the result for the barriers to innovative financing of urban road projects in Ghana, this research was interested in how the level of involvement of project finance has shaped the

experience of the major stakeholders on the barriers of urban roads. In section 4.2.5 of this chapter, the demographic data were characterised into two main separate sets namely the level of involvement – Yes or No. From these two domain sets, the independent group sample t-test of the dependent variables was conducted to determine whether there exists any level of agreement between them in respect of perceived barriers to innovative financing of urban road projects.

With independent groups, t-test is most appropriate when different participants from the same population have implemented in each of the different conditions (Coakes et al., 2001). In this regard, this inquiry wishes to conclude whether the difference between the perceived barriers of those who have involved in project finance (innovative finance) is significant.

Assumptions:

Barriers to innovative financing are assigned to one of two sets indiscriminately. The dissemination of the means linked are normal with equal variances as inferred from the work of Field (2005a).

Test: The hypotheses for the comparison of two independent groups are:

$$H_0: u_1 = u_2 \text{ (means of the two groups are equal)}$$

The null hypothesis for the independent t-test is that the population means from the two unrelated groups are equal and,

$$H_a: u_1 \neq u_2 \text{ (means of the two group are not equal)}$$

The alternative hypothesis for the independent t-test is that the population means from the two unrelated groups are unequal. When the p-value is less than 0.05 ($p < 0.05$) then the difference between the two means is statistically significant and that there is evidence to reject the null hypothesis in favour of the alternative (Field, 2005a). Likewise, when the p-value is greater than 0.05 ($p > 0.05$) then the difference between the two means is not statistically significant then the null hypothesis is accepted.

In the Group Statistics Table (see Table 4.5) the mean and standard deviations for each of the two groups are presented. Likewise, the table also presents the number of respondents in each group. Cursory look at the Table reveals that respondents that have been involved in project finance (YES) were twenty-nine (29) and fourteen (14) were the respondents in the 'No' category. Also, in most cases standard deviations were more than one (1) indicating inconsistency in the level of agreement of respondents. However, table 4.5 suggests smaller standard errors attributed to the adequate sample size and therefore reflect a degree of consistency between means of different samples and more likely to have a high level of accuracy (see for instance Field, 2005).

Table 4.5 Group Statistics

Barriers	Project Finance involvement	N	Mean	Std. Deviation	Std. Error Mean
Contractual Complexity	Yes	29	3.6552	1.00980	.18752
	No	13	3.6154	.86972	.24122
Unfavourable economic and commercial conditions	Yes	29	3.8276	1.07135	.19894
	No	14	4.0714	1.07161	.28640
Transaction costs	Yes	29	3.3448	.85673	.15909
	No	14	3.5000	.65044	.17384
Public Accountability	Yes	29	3.3103	1.03866	.19287
	No	14	3.3571	1.00821	.26945
Small Capital Market	Yes	29	3.5517	.86957	.16148
	No	14	3.1429	.94926	.25370
Operator Capabilities	Yes	29	3.6897	.80638	.14974
	No	14	3.3571	.74495	.19910
Problems with the private sector	Yes	29	3.1379	1.12517	.20894
	No	14	3.5714	1.22250	.32673
Over-reliance on the traditional sources	Yes	29	3.6897	1.13715	.21116
	No	14	3.4286	1.15787	.30945
Corruption issues	Yes	29	4.1379	1.15648	.21475
	No	14	4.3571	.84190	.22501
Problems with the public sector	Yes	29	3.5517	1.18280	.21964
	No	14	3.8571	1.09945	.29384

		Levene's Test for Equality of Variances		t-test for Equality of Means						
						Sig. (2- tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df				Lower	Upper
Contractual Complexity	Equal variances assumed	.776	.384	.123	40	.903	.03979	.32373	-.61450	.69407
	Equal variances not assumed			.130	26.706	.897	.03979	.30553	-.58743	.66700
Unfavourable economic and commercial conditions	Equal variances assumed	.044	.835	-.699	41	.488	-.24384	.34869	-.94803	.46034
	Equal variances not assumed			-.699	25.785	.491	-.24384	.34872	-.96093	.47325
Transaction costs	Equal variances assumed	1.473	.232	-.598	41	.553	-.15517	.25942	-.67907	.36873
	Equal variances not assumed			-.658	33.111	.515	-.15517	.23565	-.63454	.32420
Public Accountability	Equal variances assumed	.003	.957	-.140	41	.890	-.04680	.33491	-.72317	.62957
	Equal variances not assumed			-.141	26.504	.889	-.04680	.33137	-.72731	.63371
Small Capital Market	Equal variances assumed	.141	.709	1.403	41	.168	.40887	.29147	-.17976	.99750
	Equal variances not assumed			1.360	23.849	.187	.40887	.30073	-.21202	1.02975
Operator Capabilities	Equal variances assumed	.176	.677	1.298	41	.202	.33251	.25626	-.18501	.85004
	Equal variances not assumed			1.335	27.745	.193	.33251	.24912	-.17800	.84302
Problems with the private sector	Equal variances assumed	.822	.370	-1.151	41	.256	-.43350	.37651	-1.19387	.32688
	Equal variances not assumed			-1.118	23.947	.275	-.43350	.38782	-1.23402	.36702
Over-reliance on the traditional sources	Equal variances assumed	.008	.928	.701	41	.487	.26108	.37222	-.49064	1.01281
	Equal variances not assumed			.697	25.371	.492	.26108	.37463	-.50992	1.03209

Corruption issues	Equal variances assumed	2.516	.120	-.631	41	.531	-.21921	.34719	-.92037	.48195
	Equal variances not assumed			-.705	34.269	.486	-.21921	.31104	-.85114	.41272
Problems with the public sector	Equal variances assumed	.187	.667	-.811	41	.422	-.30542	.37654	-1.06586	.45502
	Equal variances not assumed			-.833	27.587	.412	-.30542	.36686	-1.05740	.44656

Table 4.6 Independent Samples test for barriers to innovative financing of urban roads



Table 4.16 provides results for the independent sample tests for the barriers to innovative financing of urban roads in Ghana. The first section of the Table 4.6 gives the results for the Levene's Test for Equality of Variances. This tests whether the variation in the scores of the two groups is the same. The significance level of the test is larger than .05 indicating that the variances for the two groups (Yes and No) are the same. Further analysis of the table suggests that:

Contractual Complexity

From the Table 4.6, the Levene's test for equality of variance, the sig. value for contractual complexity is larger than 0.05 and that is 0.384. As already noted, this implies that the scores for the two groups are the same. Hence the variability in the project finance involvement is the same. It is apparent from Table 4.5 that the difference in mean values between the two groups is not significant. 'Yes' respondents had a mean value of 3.655 whereas the 'No' respondents had a mean value of 3.615. Interestingly, the standard deviation of 'No' respondents was less than one (1) indicating there is agreement in the response. Whilst the standard deviation of the 'Yes' respondents was more than one depicting the reverse (refer Table 4.5). The examination of the table further suggests that the barrier as the respondents considered does not depend on their involvement in project finance. In Ghana, contractual complexity is considered a barrier by both categories of respondents. The findings concur study by Chan et al. (2009) which established that contractual arrangements of project finance (innovative financing) can cause a delay in the execution of projects because of the degree of complexity.

Unfavourable economic and commercial conditions

From table 4.6 the sig. value of Unfavourable economic and commercial conditions is larger than 0.05. This indicates that the variability in the two types of respondents is about the same; that is the mean score in 'Yes' do not vary too much more than those that have not been involved in project finance ('No'). Hence, variability in the two categories of respondents is not significantly different. A cursory look at the table reveals that, although, both categories consider the barrier as significant respondents who have a 'No' experience in project finance perceived the barrier as more significant than the other category of respondents – having a mean value of 4.071 whereas respondents with a 'Yes' involvement in project finance had a value of 3.828 (see Table 4.5). Both groups had a standard deviation more than one (1) suggesting variability in the agreement of response. The plausible explanation could be that the respondents understood the barrier in their own ways.

Transaction costs

Transaction costs include the cost of all the processes that lead to the realisation of the projects (Chan et al., 2009). This includes inter alia contracting and negotiating costs, cost of arranging finance, etc. The two groups – 'Yes' and 'No' – had mean values 3.345 and 3.500 respectively (Table 4.5). This lend to the plausible explanation that the respondents with relative experience in project finance ('Yes' group) do not regard this as a significant barrier to innovative financing. However, from table 4.6 the sig. value of Transaction costs is larger than 0.05. This indicates that the variability in the two types of respondents is about the same.

Public Accountability

From the Table 4.6, the Levene's test for equality of variance, the sig. value for public accountability is larger than 0.05 and that is 0.957. As already established this implies that the scores for the two groups are the same. Hence the variability in the project finance involvement is the same. Contrary to earlier studies by Chan et al. (2009) and Badu et al. (2012) that most innovative finance lack public accountability and hence likely to impact negatively on the adoption of innovative financing approaches to the delivery of roads, the findings seemingly seek to suggest that public accountability is not a significant barrier. The variables had values of mean and standard deviations (3.3103, 1.03866) and (3.3571, 1.00821) for 'Yes' and 'No' respondents respectively (Table 4.5). However, it is worthy of note that the standard deviations all had values greater than one (1) indicating that the understanding of the variables could be a major factor for this results.

Small Capital Market

Likewise, from the Table 4.6, the Levene's test for equality of variance, the sig. value small capital market is larger than 0.05 and that is 0.709. The two groups – 'Yes' and 'No' – had mean values 3.552 and 3.143 respectively (Table 4.5). This lend to the plausible explanation that the respondents with relative experience in project finance ('Yes' group) regard this as a significant barrier to innovative financing. It understands as the capital market size determines the size of funds available for the projects and thus small market size is always going be a barrier to innovative financing. However, from table 4.6 the sig. value of Transaction costs is larger than 0.05. This indicates that the variability in the two types of respondents is about the same.

4.3.4 Improving Innovative Financing of Urban Roads Projects in Ghana

As part of the specific objectives of the study it deemed necessary to establish ways of improving innovative financing in urban road projects. The study considered that knowledge of this kind can help give insight to the factors that may help in the improvement of innovative financing. Through extant literature the study established six (6) factors capable of improving innovative financing of urban roads delivery in Ghana. Subsequently, the respondents were asked to rate the level of significance of the influencing factors from 1 to 5, where 1 represents Not Significant, 2 represents Less Significant, 3 represents Moderately Significant, 4 represents Significant and 5 represents Very Significant.

In establishing the factors that can help improve innovative financing of roads, the study was interested in the level of significance of the identified factors. Hence, in analysing the results the descriptive statistics was used (see Table 4.7).

Table 4.7 Descriptive Statistics of Improving innovative Financing of urban roads in Ghana

Factors	N	Mean	Std. Deviation	Ranking
Project risk allocation	43	3.8837	.98099	5
Competitive bidding processes for project financing projects	43	4.1860	.95757	2
Full transparency and Accountability	43	4.2326	.99612	1
Fiscal Prudence	43	3.9070	.71760	4
Expansion of Capital Market	43	3.7209	.93416	6
Sustainable innovative Financing approaches	43	4.1628	.87097	3

From Table 4.7, the standard deviations were less than one (1) indicating consistency in the agreement of respondents. More so, from the Table all the factors had a mean value more than 3.50 suggesting that they were significant to the improvement of innovative financing of road projects in Ghana (see sub-section 4.3.1).

Full Transparency and Accountability

The factor was ranked the highest by respondents altogether with a mean value of 4.233. Already, DiNapoli (2013) had established that there should be public involvement and the communities to be affected by such road networks must be heard. This, he argued would protect the interest of tax payers and the public with detailed monitoring and proper reporting throughout the whole processes. The findings largely agree with this stance that full transparency and accountability cannot be overlooked if the desired results of innovative financing are to be achieved.

Competitive bidding processes for project financing projects

Conventionally, innovative financing approaches to the delivery of projects do not encourage the utilisation of competitive bidding. Other methods are rather used for the award. However, DiNapoli (2013) was of the view that getting value for money requires a level playing ground for all prospective investors. Consequently, the respondents established that *competitive bidding processes* must be used for procuring project finance projects. Thus the reason for the variable being ranked second with a mean value of 4.186 (refer to Table 4.7).

Sustainable innovative Financing approaches

Innovative financing approach that is not sustainable is likely to plummet the project into huge cost and time overruns. Hence, sustainable innovative financing approaches were ranked third by the respondents as significant to the improvement of innovative financing of urban roads in Ghana. The variable attained a mean value of 4.163. The findings follow the conventional wisdom of financing of projects.

Project Risk Allocation

Risk is inherent in every human endeavour and to a larger extent the attraction of investors and private financiers invariably depends on the level of risk associated with the innovative approach to the project delivery. Many investors are thus intimidated by the inherent risks of project financing. The finding established that *Project Risk allocation* is instrumental to the improvement of innovative financing of urban roads in Ghana. Consequently, the variable had a mean value of 3.884.

4.4 CHAPTER SUMMARY

This chapter was devoted to the analysis and discussions of the results of the data collected from obtained from the field survey. It began with a brief discussion of the survey questionnaires and descriptive statistics of the results obtained from the field. The chapter concluded with descriptive statistics (i.e. Mean score index) of the factors that would improve innovative financing of road projects in Ghana. In addition, independent sample t-test and RII used to analyse other specific objectives of the research.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

The huge deficit in urban roads network and constraints on government fiscal budgets call for a paradigm shift in the financing of road projects in Ghana. The study sought to explore innovative financing mechanisms to urban road projects in Ghana. Through the review of extant literature, several factors were identified including barriers, drivers, innovative approaches of procurement, and ways of improving the situation. Adopting the quantitative research approach a questionnaire survey was employed to examine the identified factors by respondents with diverse background. The previous chapters presented the theoretical underpinnings of the study, procedures for addressing the research theme, analysed and discussed the results of the study. Finally, this chapter presents the findings of the study in relation to the laid out objectives of the study. Recommendations from the study are put forth. The study limitations and directions for future research are also presented

5.2 ATTAINING THE RESEARCH OBJECTIVES

The study was articulated to achieve a particular aim that is to explore the sustainable innovative ways of road project financing in the Ghanaian construction industry. To realise the above aim, specific objectives were set. The objectives of the study include:

- i. To identify the current state of road financing in Ghana.
- ii. To identify the inherent barriers to sustainable innovative financing of road projects in the Ghanaian construction industry; and

- iii. To identify the drivers to sustainable innovative financing of road projects in Ghana.

5.2.1 Review of Research Objectives

As already established, the research aim was to explore sustainable innovative ways of road financing with focus on urban road projects in the Ghanaian construction industry. Consequently, research objectives are set in order to accomplish the above aim. In this subsection, the research objectives are revisited to consider how they were attained through the various phases of the study. The study utilised relative importance index, mean score and standard deviation altogether in the analysis of some specific objectives; and independent t-test in the analysis of certain objective.

OBJECTIVE 1: To identify the current state of road financing in Ghana.

In attempt to explore the current state of road financing in Ghana, an overview of financing of road projects was presented. The current state as identified revealed that there exists huge financing gap of road infrastructure in Ghana, especially in urban road projects. Traditionally, road financing has been the onus of the government. However, for some few years, other providers are creeping into the provision of roads – donor agencies. Subsequently, innovative financing of road projects identified were analysed. From the analysis, construction management and public private partnership were ranked first and second respectively. The two were considered as the often used financing options in urban road projects in Ghana. However, construction management had a standard deviation greater than one indicating inconsistency in agreement.

OBJECTIVE 2: To identify the inherent barriers to sustainable innovative financing of road projects in the Ghanaian Construction Industry.

To achieve the above objective, respondents were grouped into two main categories; namely those who have involved in project finance (Yes) and those who have never involved in project finance (No). The idea was that the level of involvement shapes the perceived barriers of innovative financing. Consequently, independent t-test was performed to analyse the barriers from the perspectives of these two categories. Some of the variables had no variability. Whereas other variables (barriers) were established to be different from the two categories. Most Variables had a mean value of more than 3.50. This indicates that most of the barriers are significant and their involvement in project finance had no influence on the perceived barriers.

OBJECTIVE 3: To identify the drivers to sustainable innovative financing of road projects in Ghana.

From the review of germane literature, seven (7) drivers were identified. Correspondingly, respondents were asked to rate the drivers on a likert scale to indicate their significance level. All the drivers were ranked significant by the respondents. Also, there was consistency in the agreement of the respondents. Surprisingly, faster delivery, although it was ranked significant it had a standard deviation greater than one suggesting variability in agreement.

5.3 RECOMMENDATIONS

The current strain on public budget makes it more important to find innovative approach to arresting the current urban road deficit in Ghana. This formed the basis for this study.

Consequently, the findings from the study inform the following recommendations to be put forward. These recommendations include:

- It has been noted over the years that the few infrastructure projects delivered through innovative financing were not realised using competitive bidding. The result has always been cost not meeting budget. The findings indicate that if competitive bidding is adopted for such projects, there is the possibility of getting value for money and quality is also assured.
- Most of the projects also have not been transparent. Full details have not been disclosed to citizens. Communities affected have not been engaged and listened to. The end results usually are demonstration among others, which all lead to project cost and time overruns. It is thus recommended that there must be public engagement, since it has been established to aid in the achieving of desired results.

5.4 LIMITATION OF THE STUDY

As with any research endeavour this study also had certain limitations. The study was limited geographically to only Accra and Kumasi in the Greater Accra and Ashanti region respectively. Thus the sample used for the study was affected. There was the possibility of the mean values being affected if the sample size was increased.

5.5 DIRECTIONS FOR FUTURE STUDY

The study limitation opens way for new areas to be explored. These areas need further research attentions. The following areas have been suggested for future studies:

- The study was limited to only two regions. Research should be conducted to include all the regions in Ghana.
- Also, the sample involved many respondents in the public sector (Civil servants, public servants, etc.). A different sampling technique that gives equal number of respondents must be used to conduct a research on the same discipline.
- The methodological approach adopted was quantitative. A qualitative approach must be adopted for future research on the same topic.



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APPENDIX

RESEARCH QUESTIONNAIRE

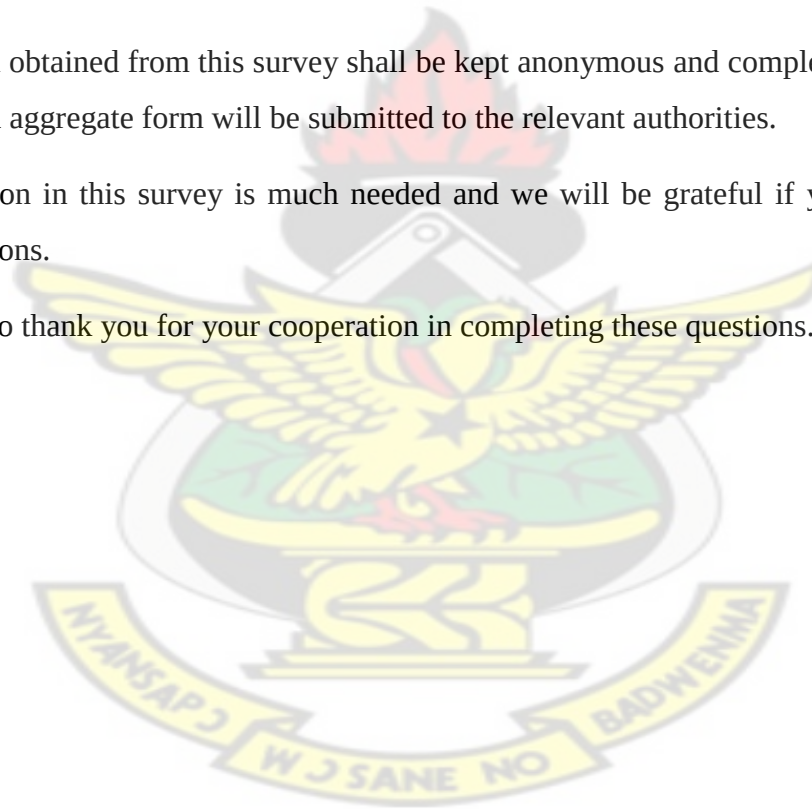
The objectives of the study are:

- To identify the current state of road financing in Ghana.
- To identify the inherent barriers to sustainable innovative financing of road projects in the Ghanaian construction industry; and
- To identify the drivers to sustainable innovative financing of road projects in Ghana.

The information obtained from this survey shall be kept anonymous and completely confidential. Only findings in aggregate form will be submitted to the relevant authorities.

Your participation in this survey is much needed and we will be grateful if you could answer these few questions.

We would like to thank you for your cooperation in completing these questions.



PART I: BACKGROUND OF RESPONDENTS

1. Kindly indicate your profession?
 - a) Contractor
 - b) Consultant
 - c) Public Servant
 - d) Civil Servant
 - e) Private Investor
2. Please indicate your position in your establishment?
 - a) Chief Executive Officer
 - b) Managing Director
 - c) Special Advisor
 - d) Quantity Surveyor
 - e) Architect
 - f) Structural Engineer
3. Please indicate your years of experience in road construction?
 - a) Less than 10 years
 - b) 10 to 20 years
 - c) Above 20 years
4. Have you ever been involved in any project finance in your years of experience?
 - a) Yes
 - b) No



PART II: INNOVATIVE FINANCE OF ROAD INFRASTRUCTURE PROJECTS

- I. In your experience, which of the following modern methods are used to deliver innovative financing of road infrastructure projects in Ghana? Please indicate the level of influences of each factor by ticking the appropriate boxes.

1-Not Very Frequent, 2-Not Frequent, 3-Moderately Frequent, 4-Frequent, 5-Very Frequent

A. Modern methods of road financing in Ghana	Levels of influence				
	1	2	3	4	5
1. Design and Build					
2. Turnkey					
3. Build, Own, Operate and Transfer					
4. Build, Own and Transfer					
5. Construction Management					
6. Public Private Partnership					

- II. In your experience, which of the following factors are the barriers to innovative financing of road infrastructure projects in Ghana? Please indicate the level of influences of each factor by ticking the appropriate boxes.

1-Not Very Severe, 2-Not Severe, 3-Moderately Severe, 4-Severe, 5-Very Severe

B. Barriers to sustainable financing of road project	levels of influence				
	1	2	3	4	5
1. Contractual complexity					
2. Unfavourable economic and commercial conditions.					
3. Transaction costs					
4. Reduced Public accountability					
5. Small capital market					
6. Operator capabilities					
7. Problems with the public sector					
8. Problems with the private sector					
9. Over-reliance on the traditional sources					

10. Corruption issues					
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- III. In your experience, which of the following factors are the drivers of innovative financing of road infrastructure projects in Ghana? Please indicate the level of influences of each factor by ticking the appropriate boxes.

1-Not Very Important, 2-Not Important, 3-Moderately Important, 4-Important, 5-Very Important

C. Drivers to sustainable innovative financing	Levels of influence				
	1	2	3	4	5
• Faster delivery					
• Identifiable risk and better risk allocation					
• Accessible financing					
• Improved Quality of services					
• Political Stability					
• Demand need					
• Cost effectiveness					

- IV. Please, suggest ways for improving innovative financing of road projects in Ghana. Please rank on a Likert scale of 1-5, which of these factors is most significant in the improvement of innovative financing.

1-Not very Significant, 2-Not Significant, 3-Moderately Significant, 4-Significant, 5-Very Significant

D. FACTORS	RANK				
	1	2	3	4	5
a. Project Risk Allocation					
b. Competitive bidding processes for Project financing projects					
c. Full transparency and Accountability					
d. Fiscal prudence					

e. Expansion of capital market					
f. Sustainable innovative financing strategies					

THANK YOU

KNUST

